January 1996

Mathematics 33

Grade 12 Diploma Examination

Alberta

EDUCATION

January 1996

Mathematics 33

Grade 12 Diploma Examination

Description

Time: 2.5 h. You may take an additional 0.5 h to complete the examination.

This is a **closed-book** examination consisting of

- 37 multiple-choice and 12 numerical-response questions of equal value, worth 70% of the examination

- 4 written-response questions, worth a total of 21 marks or 30% of the examination

Total possible marks: 70

This examination contains sets of related questions

A set of questions may contain multiple-choice and/or numerical-response and/or written-response questions.

When required, a grey bar will be used to indicate the end of a set.

A mathematics data booklet is provided for your reference.

The perforated pages at the back of this booklet may be torn out and used for your rough work. No marks will be given for work done on the tear-out pages.

Instructions

- Fill in the information required on the answer sheet and the examination booklet as directed by the presiding examiner.

- You are expected to provide your own scientific calculator.

- Use only an HB pencil for the machine-scored answer sheet.

- If you wish to change an answer, erase **all** traces of your first answer.

- Consider all numbers used in the examination to be the result of a measurement or observation.

- Do not fold the answer sheet.

- Now turn this page and read the detailed instructions for answering machine-scored and written-response questions.

Multiple Choice

- Decide which of the choices **best** completes the statement or answers the question.

- Locate that question number on the separate answer sheet provided and fill in the circle that corresponds to your choice.

Example

This examination is for the subject of

A. mathematics
B. chemistry
C. biology
D. physics

Answer Sheet

● Ⓑ Ⓒ Ⓓ

Numerical Response

- Record your answer on the answer sheet provided by writing it in the boxes and then filling in the corresponding circles.

- If an answer is a value between 0 and 1 (e.g., 0.25), then be sure to record the 0 before the decimal place.

- **Enter the first digit of your answer in the left-hand box and leave any unused boxes blank.**

Example 1

The value of $\tan 35°$ to the nearest tenth is _____.

(Record your answer on the answer sheet.)

Value: 0.7002075
Value to be recorded: 0.7

Record 0.7 on the ⟶ answer sheet

0	.	7	

Example 2

The y-intercept for the quadratic function
$y = 2x^2 + 7x + 32$ is _____.
(Record your answer on the answer sheet.)

Value to be recorded: 32

Record 32 on the ⟶ answer sheet

3	2		

(answer grid with bubbles 0-9)

Written Response

- Write your answers in the examination booklet as neatly as possible.

- For full marks, your answers must be well organized and address **all** the main points of the question.

- Description and/or explanations of concepts must be correct and reflect pertinent ideas, calculations, and formulas.

- Your answers **should be** presented in a well-organized manner using complete sentences for a written response, and correct units for a numerical response.

Do not turn the page to start the examination until told to do so by the presiding examiner.

CONSUMERISM

Consumers have many opportunities to interpret, analyze, and solve problems related to purchasing goods and services or saving money. Answer the next eight questions related to a consumer named Dale.

Use the following information to answer the next question.

For winter driving, Dale estimates that it costs 20 cents in fuel consumption to warm up her car and 8 cents per kilometre to drive it. A table of values for this function is shown below, where c is the total cost in cents and d is distance travelled in kilometres.
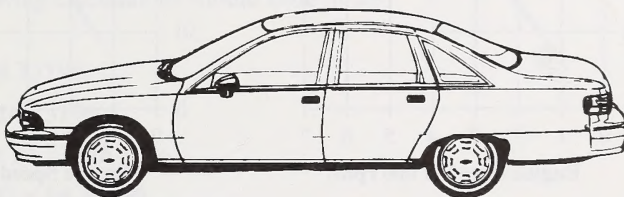
| d (km)	0	1	2	3	4	5
c (¢)	20	28	36	44	52	60

1. The total cost, described as a function of distance, is

   A. $c = 28d$
   B. $c = 20(8d)$
   C. $c = 20 + 8d$
   D. $c = 8 + 20d$

1

Use the following information to answer the next question.

When Dale decided to buy a car, she studied the following graphs to compare Admiral Motors' 3.3-litre engine to their 3.5-litre engine.

**Output of
3.3-Litre Engine**

**Output of
3.5-Litre Engine**

Horsepower vs. Engine Speed (1 000 rpm)
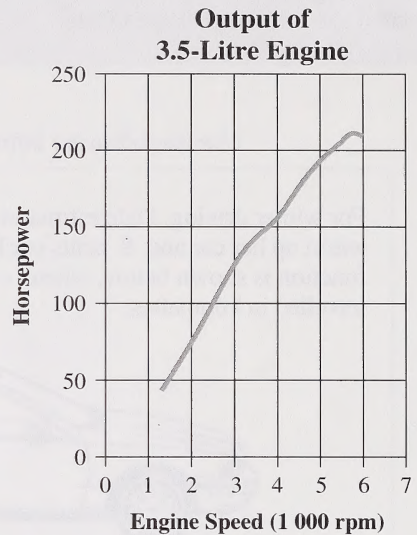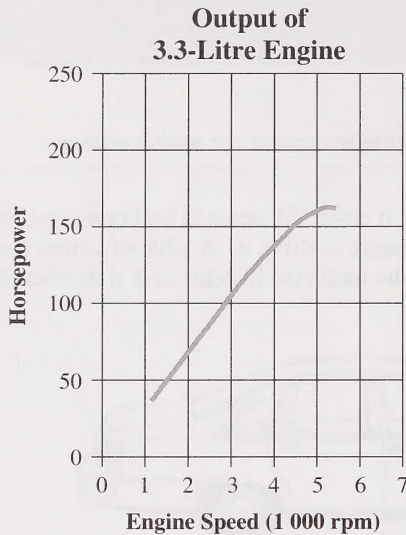
2. Which statement correctly compares the horsepower of the two engines?

A. At 5 000 rpm, the 3.5-litre engine has about 30 more horsepower than the 3.3-litre engine.

B. At 5 000 rpm, the 3.5-litre engine has about 30 less horsepower than the 3.3-litre engine.

C. At 5 000 rpm, the 3.5-litre engine reaches maximum horsepower.

D. At 5 000 rpm, the horsepower is the same for both engines.

3. To buy a new car, Dale obtained a loan of $12 050 that she financed over 2 years at 6.25% per annum. Her monthly payments are

A. $502.08

B. $535.42

C. $564.84

D. $646.50

Dale also purchased a small condominium. She took out a $40 000 mortgage at 13% per annum.

---

4. When using the monthly payment on a $1 000 mortgage table to determine monthly payments on a $40 000 mortgage at 13% per annum financed over 10 years, which of the following calculations should Dale make?

A. 4×14.73196

B. 40×14.73196

C. 400×14.73196

D. $40\,000 \times 14.73196$

---

5. Dale's parents spend $300 per month on cigarettes. To motivate her parents to quit smoking, Dale calculated that if they deposited this money at the beginning of each month into an annuity earning 1% per month, then the value of the annuity after 1 year would be

A. $3 504.75

B. $3 719.17

C. $3 842.80

D. $3 960.00

Dale drove 25 km from home to the bus stop by car and then used the bus to travel 8 km to the bank. The total time of the trip took one hour. The average speed of the car was 18 km/h more than the average speed of the bus. The chart below can be used to determine the length of time Dale travelled in each vehicle.

	Distance (km)	Average Speed (km/h)	Time (h)
Car	25	$x + 18$	?
Bus	8	x	?

6. The expression that can be used to determine the time Dale travelled by **bus** is

A. $8x$

B. $\dfrac{25}{x + 18}$

C. $\dfrac{x}{8}$

D. $\dfrac{8}{x}$

Numerical Response

1. The bank's customer relations officer asked a group of 20 customers, "Are you satisifed with our service?" Dale was one of five of the customers sampled who responded "yes" to this question. Based upon this sample and expressed to the nearest percent, the upper limit of the 90% confidence interval for customers who responded "yes" is _____ .

(Record your answer on the answer sheet.)

> *A bank official used tables to determine the present value of an annuity that pays Dale $2 000 at the end of each year for 4 years.*

Numerical Response

2. Use the present value of an annuity table provided in the data booklet to determine, to the nearest dollar, the present value of the annuity if interest is at 8% per annum compounded annually. _____ .

(Record your answer on the answer sheet.)

TECHNOLOGY

Yin and Henry used a graphing calculator to assist in analyzing, interpreting, and exploring equations and their graphical representations. Answer the next twelve questions related to equations and their graphical representations.

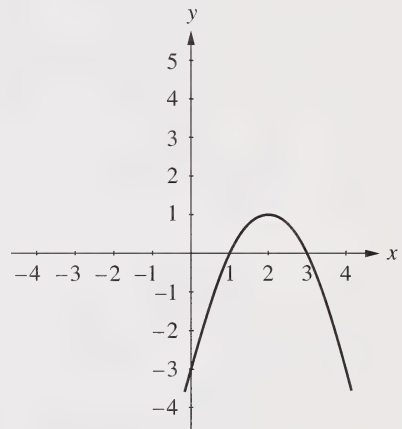*Use the following graphs to answer the next three questions.*

Graph I

The graph of $y = x^2$ is shown below.
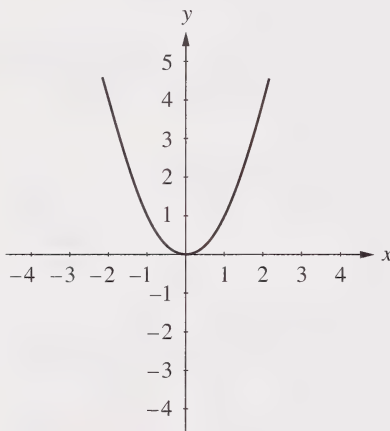
Graph II

The graph after performing transformations on graph I is shown below.

7. If graph II is represented by the equation $y = -1(x - h)^2 + k$, then k must be

   A. -1
   B. 1
   C. -3
   D. 3

6

8. What is the range of $y = -1(x - h)^2 + k$ illustrated by graph II?

    A. $y \leq 1$

    B. $y \geq 1$

    C. $x \leq 1$

    D. $x \geq 1$

9. For graph II, when the value of $x = 4$, the value of y is

    A.   4

    B.   0

    C.   −1

    D.   −3

10. Yin and Henry graphed a cubic function. Which function did they graph?

    A. $f(x) = 3x^2 + 15$

    B. $f(x) = -3x^3 + 15$

    C. $f(x) = 3\sqrt{x} - 15$

    D. $f(x) = -3x - 15$

11. Yin used her knowledge of transformations to correctly predict the range of $y = 2|x - a| + b$ to be

    A. $y \leq b$

    B. $y \geq b$

    C. $y \leq a$

    D. $y \geq a$

Henry graphed a function where the graph was *v*-shaped, its vertex was at (–3, –5), and it passed through (1, –1). Henry then wrote the following statements about the graph:

  I. If the equation $y = |x|$ is transformed to give the graph described above, the new equation is of the form $y = a|x + 3| - 5$.

  II. The transformed graph is a shift of the graph of $y = |x|$ stretched by a factor of 4.

  III. The basic graph has been shifted to the left 3 units and down 5 units.

  IV. The graph is an example of an absolute value function.

  V. The equation of the graph is $y = -2|x - 3| - 5$.

12. Which of the statements about the graph originally described above are **true**?

A. Statements I, II, and IV
B. Statements I, III, and IV
C. Statements I, II, III, and IV
D. Statements I, III, IV, and V

Yin and Henry used a graphing calculator to display a parabola whose axis of symmetry is parallel to the *y*-axis.
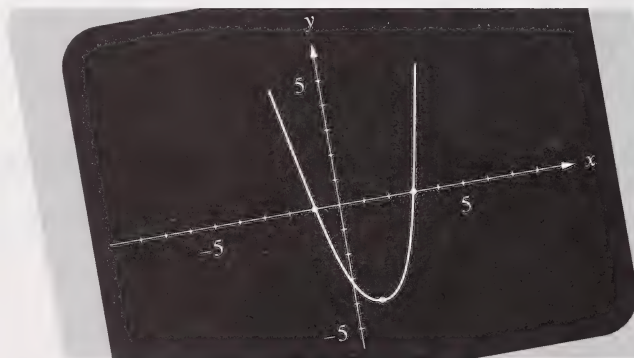
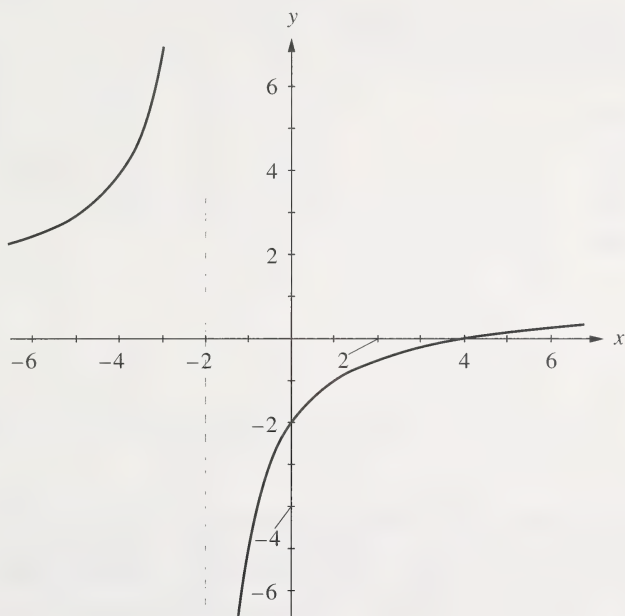**Numerical Response**

3. If the *x*-intercepts of the parabola are –1 and 3, then the equation of the axis of symmetry is $x =$ _____ .

(Record your answer on the answer sheet.)

8

Use the following information to answer the next question.

Henry connected his understanding of non-permissible values to the following graph of a function.
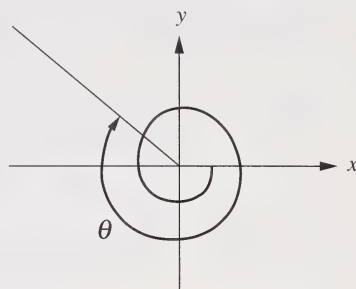

13. If the graph above is the graph of the function $y = \dfrac{x-4}{x+r}$, then the value of r is

A. -4

B. -2

C. 1

D. 2

> Yin knew that trigonometric graphs involve connections between algebra and geometry on a coordinate plane.

14. In the diagram at the right, the **best** estimate for the value of θ is

    A. $580°$

    B. $220°$

    C. $-220°$

    D. $-580°$

Use the following information to answer the next question.

> Yin noted that a sign advertising a pop sale at Bobby's Fine Food Store was attached to a motor that caused the sign to rotate. Yin used the concept of rotational angles to display on her calculator the coordinate plane and the angle that the sign rotated through. Yin started with the angle $0°$ at time zero.
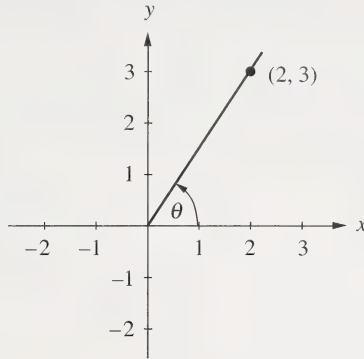
Numerical Response

4. During a time period of 5 seconds, the sign rotates at a constant rate through an angle of $130°$. When compared to an angle in standard position, the measure of the angle created during a rotation time of 12.5 seconds is _____ degrees.

(Record your answer on the answer sheet.)

Yin used a computer to plot the point $(2, 3)$ on the terminal arm of angle θ.

15. The exact value of the ratio for $\cos \theta$ is

A. $\dfrac{2}{\sqrt{13}}$

B. $\dfrac{\sqrt{13}}{2}$
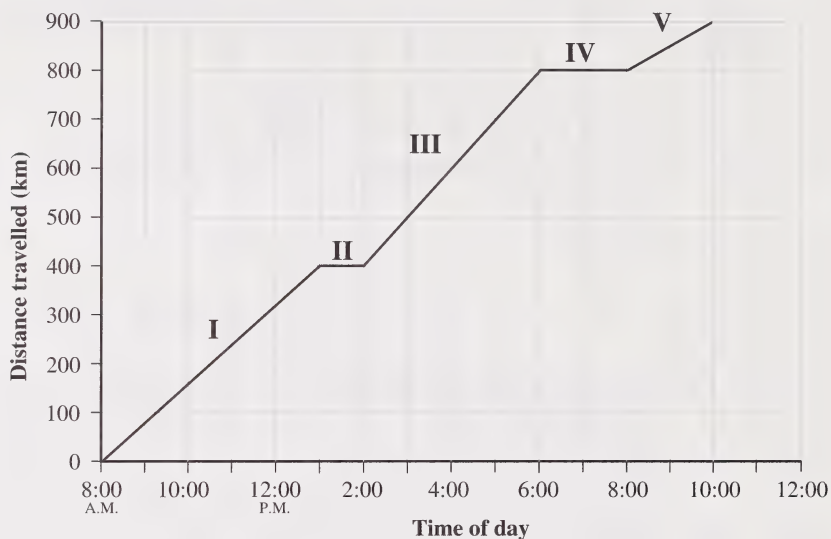
C. $\dfrac{3}{\sqrt{13}}$

D. $\dfrac{\sqrt{13}}{3}$

Use the following information to answer the next question.

Henry used a computer display to represent a trip his family took from Calgary to a camping spot north of Peace River. The family drove from Calgary to Barrhead, to Peace River, and by a back road to the camping spot.
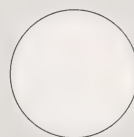

Written Response – 5 marks

1. **a.** What was the total distance travelled?

b. Interpret the horizontal segments labelled II and IV.

c. Henry stated that the greatest average speed occurred during segment I. Do you agree with Henry? Justify your answer.

16. Anita, a Mathematics 33 student, said that $\sqrt{32} + \sqrt{50} + \sqrt{98}$ has an answer that can be written as $a\sqrt{b}$. The value of b in the answer could be

   A. 2
   B. 4
   C. 5
   D. 6

17. Written as an **entire** radical, $3a\sqrt{2c}$ is equivalent to

   A. $\sqrt{6ac}$

   B. $\sqrt{18a^2c}$

   C. $\sqrt{12a^2c}$

   D. $\sqrt{36a^2c^2}$

Anita used her knowledge of multiplying two binomials to complete the following statement.

18. When $\left(\sqrt{a} + 2\sqrt{3}\right)\left(\sqrt{a} - 2\sqrt{3}\right)$ is simplified, the resulting expression is

   A. $2\sqrt{a} + 12$
   B. $2a - 4\sqrt{3a}$
   C. $a + 4\sqrt{3a}$
   D. $a - 12$

14

> *Anita recalled that when denominators contain a radical, they can be rationalized.*

19. Anita correctly determined that an equivalent form of the radical expression $\dfrac{3\sqrt{2}}{\sqrt{3}}$ is

A. $\dfrac{\sqrt{6}}{3}$

B. $3\sqrt{2}$

C. $\dfrac{\sqrt{2}}{3}$

D. $\sqrt{6}$

*Use the following information to answer the next question.*

> Bobbie, another student, used his equation-solving skills to solve the radical equation $3 + \sqrt{3x + 1} = x$. Bobbie completed the following steps:
>
> | | |
> |---|---|
> | **Step I** | $\sqrt{3x + 1} = x - 3$ |
> | **Step II** | $3x + 1 = x^2 - 9$ |
> | **Step III** | $0 = x^2 - 3x - 10$ |
> | **Step IV** | $x = -5$ or $x = 2$ |

20. In which step did Bobbie make his **first** mistake?

A. Step I

B. Step II

C. Step III

D. Step IV

Anita developed the following diagram on the computer and asked Bobbie to create a pattern using the Pythagorean Theorem.
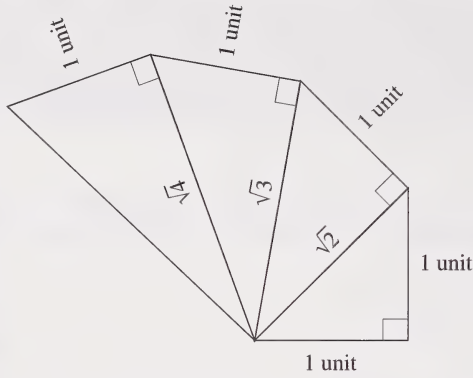
The pattern Bobbie created was:

$$2 = \left(\sqrt{1}\right)^2 + (1)^2$$

$$3 = \left(\sqrt{2}\right)^2 + (1)^2$$

$$4 = \left(\sqrt{3}\right)^2 + (1)^2$$

$$\vdots = \quad \vdots \quad + \vdots$$

$$7 = \left(\sqrt{}\right)^2 + ()^2$$

21. Based on Bobbie's pattern, 7 can be represented as

A. $\left(\sqrt{7}\right)^2 + (0)^2$

B. $\left(\sqrt{6}\right)^2 + (1)^2$

C. $\left(\sqrt{5}\right)^2 + \left(\sqrt{2}\right)^2$

D. $\left(\sqrt{4}\right)^2 + \left(\sqrt{3}\right)^2$

16

> *Anita and Bobbie discussed how their knowledge of the relationships between factoring and rational expressions could be useful in analyzing or writing simpler forms for expressions.*

22. All the non-permissible values for the variable x in the rational expression
$$\frac{(5x-2)(7x-4)^2(x-3)}{2x\,(x-3)\,(3x+1)} \quad \text{are}$$

A. $-\frac{1}{3}$ and 0

B. $-\frac{1}{3},\ 0,$ and 3

C. $\frac{2}{5},\ \frac{4}{7},$ and 3

D. $-\frac{1}{3},\ 0,\ \frac{2}{5},\ \frac{4}{7},$ and 3

23. Anita knew that the correct simplified form of the expression $\dfrac{2(v+3)(v+2)}{4\,(v+2)}$, where $v \neq -2$, is

A. $v+1$

B. $2v+6$

C. $\dfrac{v+3}{2}$

D. $\dfrac{v+3}{4}$

Use the following information to answer the next question.

Anita and Bobbie used the relationship between factoring and rational expressions to solve problems.

$$\frac{x^2 - x - 6}{x^2 + 7x + 10} = \frac{(x-3)\cancel{(x+2)}^{1}}{\cancel{(x+2)}_{1}(x+5)}$$

$$= \frac{(x-3)}{(x+5)}, \ x \neq -2, -5$$

Written Response – 6 marks

2. **a.** Show the steps Anita could use to simplify the rational expression $\dfrac{x^2 + 5x + 6}{x^2 + 2x - 3} \times \dfrac{x^2 - x}{x^2 - 4}$.

b. Now, evaluate the simplified expression in part **a** for $x = 3$.

Use this additional information to answer the next question.

Next, Anita substituted into the original rational expession to determine a value.

Anita's substitution: $\dfrac{3^2 + 5(3) + 6}{3^2 + 2(3) - 3} \times \dfrac{(3)^2 - 3}{(3)^2 - 4}$

c. Explain whether or not Anita should expect the same answer as you obtained in part **b**. Provide supporting evidence for your explanation.
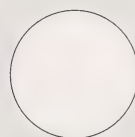
> *Anita used the concept of lowest common denominator to complete the following statements.*

24. To make the denominators of the fractions in the equation $\frac{2}{3}(x-3)=\frac{1}{2}(x+2)$ equal to the number 1, it is **best** to multiply both sides of the equation by

    A.   6

    B.   4

    C.   3

    D.   2

Numerical Response

5. When $\dfrac{x+4}{3}-\dfrac{x-2}{4}$ is simplified and written in the form $\dfrac{ax+b}{12}$, the value of **b**

is _____ .

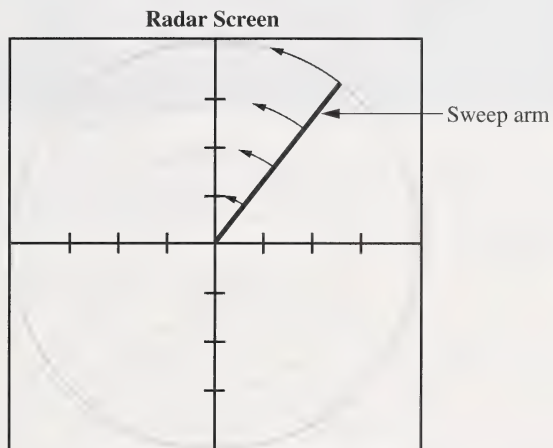(Record your answer on the answer sheet.)

20

ALBERTA INDUSTRIES

Some Alberta industries rely on the support of workers in aviation, power, and communication companies. These workers constantly solve mathematical problems related to information they receive.

Use the following information to answer the next question.

In aviation, radar devices use a screen similar to a coordinate plane to determine the positions of objects in air space.

On the drawing of the airplane radar screen shown below, the sweep arm sweeps the screen at a rate of 11 revolutions/minute in a counter-clockwise direction.

Radar Screen

Sweep arm

Numerical Response

6. The number of degrees the arm sweeps through in a time of 1 second is _____ .

(Record your answer on the answer sheet.)

Airplanes are sometimes used to drop water on forest fires.

Flying a straight-line, the flying distance between Fort McMurray and a forest fire is 30.0 km. Due to smoke conditions, the planes must first fly 17.3 km at an angle of 23° off this course, and arrive at point *P* before proceeding to the forest fire.
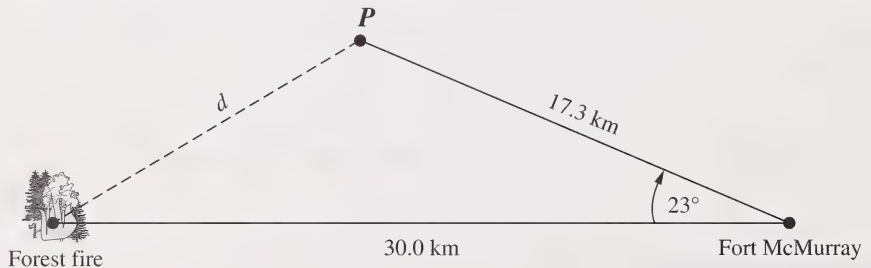
Numerical Response

7. To the nearest tenth of a kilometre, the distance (*d*) from a plane at point *P* to the forest fire is _____ .

(Record your answer on the answer sheet.)

25. Of the 40 fields, eight had experienced hail damage. Based on this sample of 40 fields, the 90% confidence interval for the percentage of all fields with hail damage in Southern Alberta is

A. 2% to 15%

B. 4% to 12%

C. 10% to 40%

D. 15% to 30%

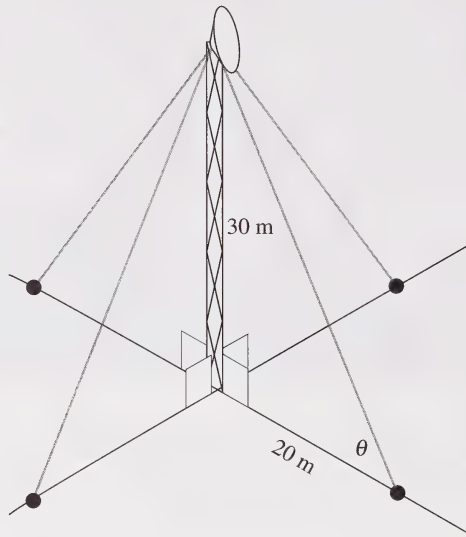*Use the following information to answer the next question.*

A company took an aerial photograph to determine the site of a new communication tower. Based on the photograph, they proposed to locate the tower at point A, as shown below.

Drumheller

30 km

120 km

62°

A
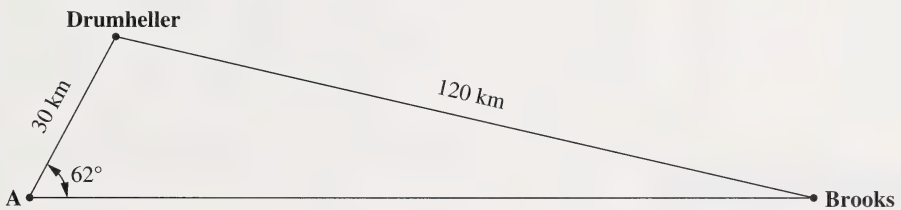
Brooks

26. The distance, to the nearest kilometre, from the proposed communication tower A to Brooks is

A. 116 km

B. 131 km

C. 136 km

D. 150 km

An installation crew needs to approximate the amount of wire needed to support a communications tower. Assume the wire is clamped at each end so that extra wire is not needed to tie it. The tower is 30 metres high and must be supported by four wire cables attached to the top of the tower and to points on the ground 20 metres from the base of the tower. The diagram below illustrates this communication tower.

30 m

20 m

θ

Numerical Response

8. To the nearest metre, the total length of wire cable needed to anchor the tower is _____ m.

(Record your answer on the answer sheet.)

Power company workers use a quadratic equation to predict wind forces on poles and towers. The formula $P = 0.0462v^2$ determines the amount of pressure produced on the surface of a power pole, where P is the pressure in pascals (Pa) and v is the wind speed in kilometres per hour.
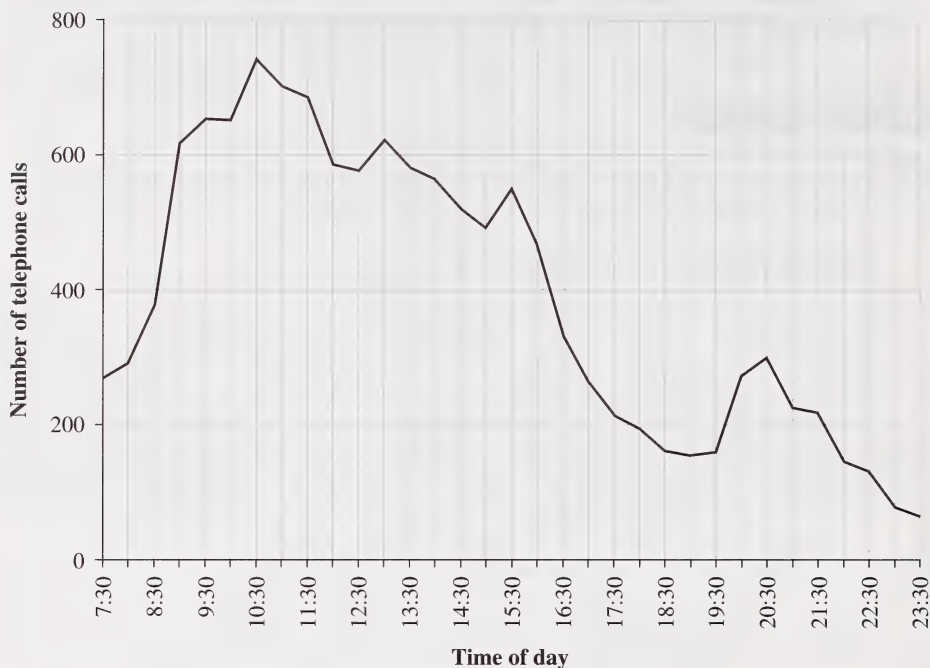
Numerical Response

9. The speed of wind that creates a pressure of 120 Pa on a power pole, to the nearest kilometre per hour, is _____ km/h.

(Record your answer on the answer sheet.)

A communications company published the following graph that shows the number of telephone calls handled by their system at particular times throughout a day.

27. Using the graph to relate the number of telephone calls handled to the time of day, determine which of the following statements is **true**.

   A. The smallest three-hour volume of calls occurred between 9:30 and 12:30.
   B. The largest three-hour volume of calls occurred between 16:30 and 19:30.
   C. The number of calls decreased between 15:30 and 19:00.
   D. The number of calls decreased between 7:30 and 10:30.

> *A pilot flying over Glacier National Park observed and reported a potential avalanche in the Rogers Pass.*

28. Park wardens used a Howitzer gun to set off a controlled avalanche. In order to calculate the time of flight for an explosive shell to reach a height of 2500 m, wardens used the quadratic equation $4.9t^2 - 800t + 2500 = 0$, where t is the time in seconds. The possible solutions for t are

A. $\dfrac{800 \pm \sqrt{689000}}{9.8}$

B. $\dfrac{-800 \pm \sqrt{689000}}{9.8}$

C. $\dfrac{-800 \pm \sqrt{591000}}{9.8}$

D. $\dfrac{800 \pm \sqrt{591000}}{9.8}$

> *A designer prepared to develop a parabolic-shaped aviation light by first reviewing some equations.*

29. Which of the following equations can be classified as quadratic?

A. $d = 30t$

B. $m = 5(2)^x$

C. $\dfrac{1}{R_T} = \dfrac{1}{R_1} + \dfrac{1}{R_2} + \dfrac{1}{R_3}$

D. $d = 9.8t + 4.9t^2$

To design the aviation light, the designer used a computer-assisted design program and made use of quadratic functions. The designer used the function $d = \frac{1}{8}w^2$, where w is one-half the total width in centimetres, and d is the depth in centimetres, to describe the reflecting surface of the light. A graphical representation of the function when the reflecting surface is 20 cm wide is shown below.
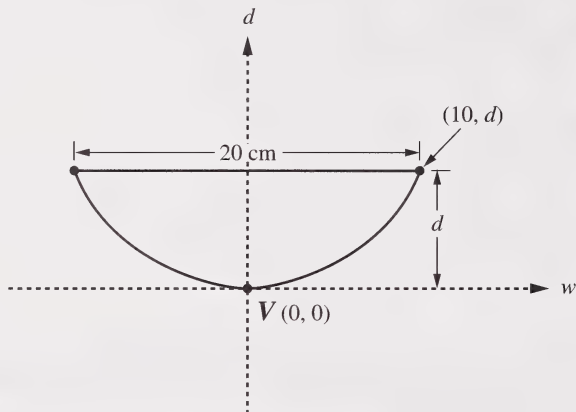
Numerical Response

10. If the aviation light must be 20 cm wide, then its depth d, to the nearest tenth of a centimetre, will be _____ cm.

(Record your answer on the answer sheet.)

Use the following information to answer the next question.

A telephone company built a microwave relay tower on a hillside, as shown in the diagram. The tower is 65 m high and makes an inside angle of 59° with the hill. A guy-wire attached to the top of the tower is anchored such that it makes an inside angle of 52° with the hill.

Microwave relay tower

52°

65 m

59°
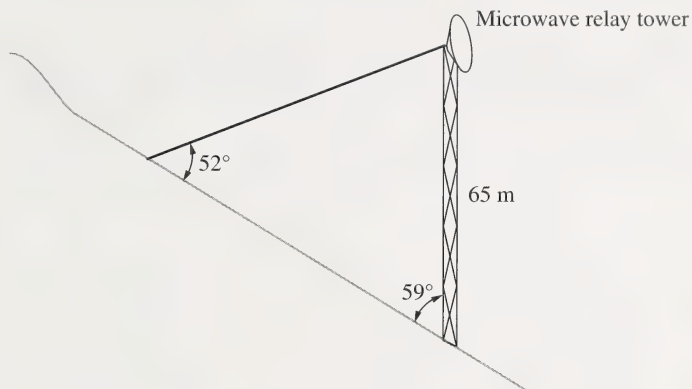
Written Response — 4 marks

3. How far from the base of the tower is the guy-wire attached to the ground? (Express your answer to the nearest tenth of a metre.)

SPORTS AND RECREATION

As a class project, Mathematics 33 students were asked to make connections between the mathematics curriculum studied and activities related to physical education. The next eleven questions relate to connections made by the students.

> *To be able to predict the maximum height, y, and horizontal distance, x, related to the path of a shot put, one student completed the square.*

30. The equation $y = x^2 - 10x + 31$ stated in the completed square form $y = a(x - h)^2 + k$ is

    A. $y = (x - 5)^2 + 6$
    B. $y = (x + 5)^2 + 6$
    C. $y = (x - 5)^2 - 6$
   **D.** $y = (x + 5)^2 - 6$

> *Finding the roots of a quadratic equation is related to determining the distance, x, travelled by a shot put.*

31. The roots of the equation $2x^2 + x - 3 = 0$ are

    A. 1 and $-\dfrac{3}{2}$

    B. $\dfrac{1}{2}$ and -3

    C. -3 and 0

    D. -1 and $\dfrac{3}{2}$

Samantha's project related her knowledge of parabolas to javelin throwing. From ground level, Samantha threw a javelin. The javelin travelled on a parabolic path that could be defined by the equation $h = -0.01(x - 38)^2 + 16$, where h is the height the javelin reaches in metres, and x is the horizontal distance the javelin travels in metres. The diagram below illustrates this.
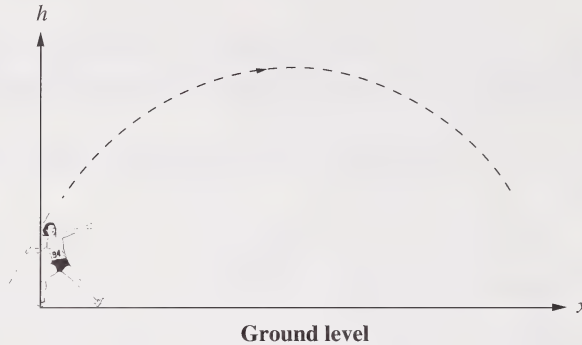
Ground level

32. From ground level, the maximum height the javelin reached was

- **A.** 16 m
- **B.** 28 m
- **C.** 38 m
- **D.** 56 m

33. To reach its maximum height, the javelin travelled a horizontal distance of

- **A.** 16 m
- **B.** 28 m
- **C.** 38 m
- **D.** 56 m

Pat worked on a problem faced by a football club. The club was considering raising their ticket prices. Pat knew that this was a problem that could be represented by the quadratic function $P(t) = -20(t - 3)^2 + 7\,500$, where $P(t)$ is the profit in dollars and t is the **change** in ticket price in dollars.

34. Based on this profit formula, Pat realized that a ticket

    A. increase of $3 would generate a profit of $7 500

    B. decrease of $3 would generate a profit of $7 500

    C. increase of $20 would generate a profit of $7 500

    D. decrease of $20 would generate a profit of $7 500

*Ahmed related an equation to the path of a baseball so he could determine the height of a ball at any time.*

Numerical Response

11. A baseball is hit with a bat. The height, h, of the baseball in metres after time, t, in seconds is given by the formula $h = 28t - 4.9t^2$. To the nearest tenth of a metre, the height that the baseball reaches 4 seconds after being hit with the bat is _____ .

(Record your answer on the answer sheet.)

Shyla connected statistics to high jumping.
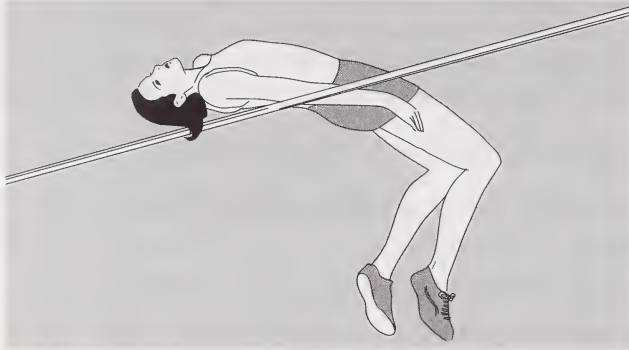
She watched a random sample of 20 girls, from various regions of the province, attempt to jump over a bar 1.2 m high. Twelve girls successfully cleared the bar.

35. Based on this sample, if 750 girls from various regions of the province participate in a high jump event, then the 90% confidence interval for the number of girls from various regions of the province clearing a 1.2 m bar will be between _____ and _____ .

A. 262 and 600
B. 300 and 563
C. 338 and 525
D. 405 and 495

> *Sasha used her ability to solve quadratic equations to determine the area of the school gymnasium.*

36. The measurements of the school gym, which is rectangular in shape, are such that the length is 9 m longer than the width. If the area of the gym floor is 252 m², then the measurements of the two sides, in metres, are

A. 6 m and 42 m
B. 9 m and 18 m
C. 9 m and 28 m
D. 12 m and 21 m

In his project, Chris related statistics to basketball after he noticed that foul shots taken in a game can be analyzed using a scatter plot. A successful foul shot earns the team one point. The scatter plot below shows the relationship between the number of foul shots taken and the number of points scored in a basketball game.
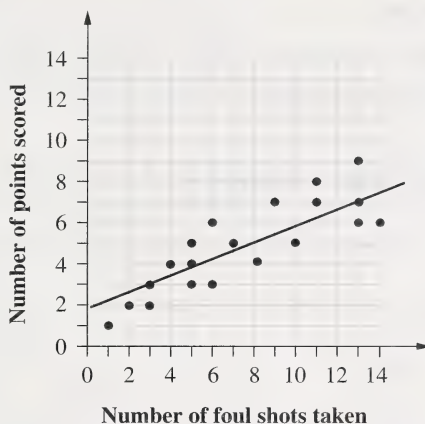
37. Based on Chris' graph, the apparent correlation between the number of foul shots taken and the number of points scored is

A. zero
B. positive
C. negative
D. undefined

Numerical Response

12. If Chris takes 8 shots, the line of best fit can be used to predict the number of points that he would probably score. The number of points Chris would score in 8 shots is _____ .

(Record your answer on the answer sheet.)

*Use the following information to answer the next question.*

Pauline's project included a statistical comparison of the Mathematics 33 and Physical Education 30 exam marks for 10 selected students.

The table summarizes Pauline's findings.

Student	1	2	3	4	5	6	7	8	9	10
Math 33 Marks (%)	30	70	95	80	60	40	50	55	70	80
Phys. Ed. Marks (%)	35	60	90	75	65	45	35	45	65	65

| Written Response — 6 marks |

4. **a.** On the grid provided below, draw a scatter plot for the above data.
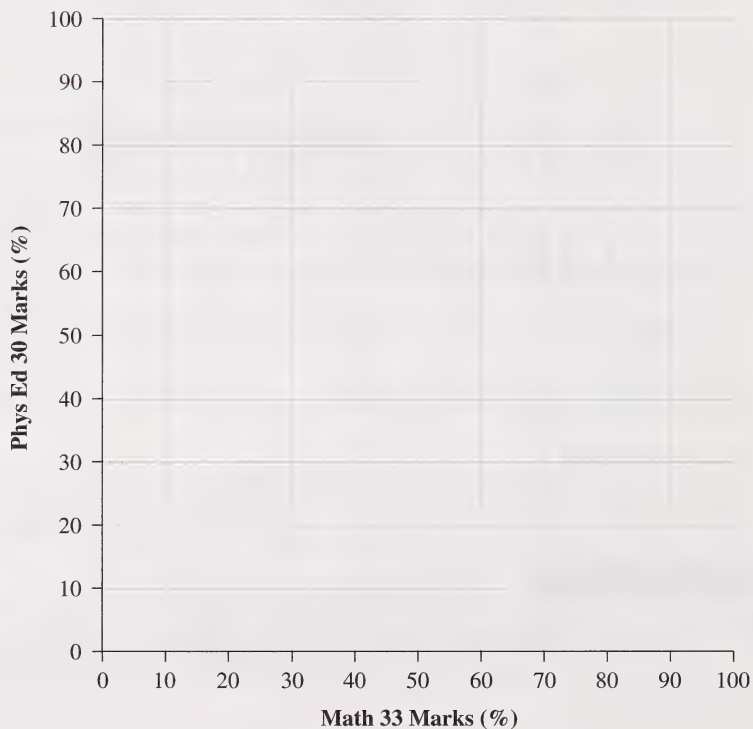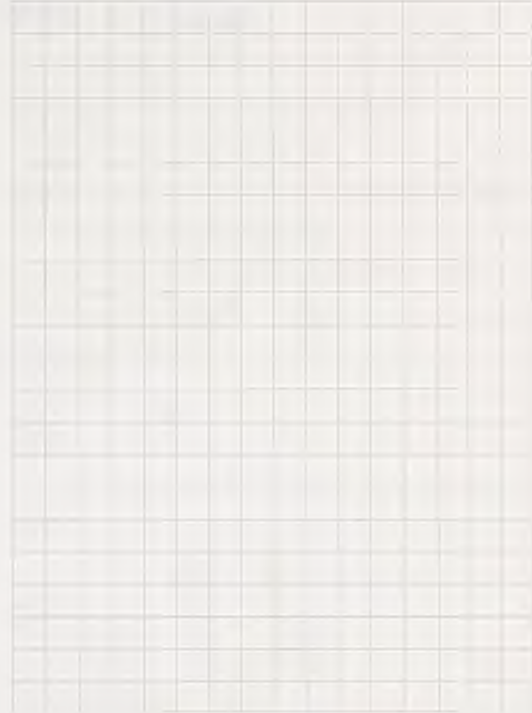
b. i. Describe the apparent correlation between a student's Mathematics 33 mark and his or her Physical Education 30 mark, stating the strength and direction of the correlation.

ii. From this correlation, make a correct inference that begins, "As Mathematics 33 marks increase, …"

c. In theory, what approximate mark would a student get in Physical Education 30 if he or she got 20% in Mathematics 33? **Explain** how you arrived at your value.

No marks will be given for work done on this page.

Fold and tear along perforation.

Mathematics 33
January 1996

Name

Apply Label With Student's Name

Mathematics 33

Name: _____ _____
(Last Name)   (Legal First Name)

Date of Birth: [ ] [ ] [ ]
                Y   M   D

Sex: [ ]

Permanent Mailing Address: _____
(Apt./Street/Ave./P.O. Box)

_____
(Village/Town/City)

_____
(Postal Code)

School Code: [ ] [ ]   School: _____

Signature: _____

For Department Use Only

M1 [ ]

M2 [ ]

M3 [ ]

M4 [ ]

No Name

Apply Label Without Student's Name

Mathematics 33